SLX-214
long range transmitter & receiver pair

smartlynx

user guide

also available:
SLX-100, SLX-111

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Introducing SmartLynx CAT 5 AV Extender

What's in the box?

Thank you for buying the Smart-e SmartLynx CAT 5 AV Extender. Depending on the configuration of your system, various quantities of the parts below may be included in your shipment.

If any of the accessories listed below are missing, please contact the Smart-e dealer you purchased products from or contact Smart-e customer support at:

+44 (0) 1306 628264

If you ordered a SmartLynx Set:

Item	Description	SLX-214
Transmitter SLX-TX111	One Input and one CAT 5 Output	Yes
Receiver SLX-RX214	One CAT 5 Input and one Output	Yes
Power Supply	24Volt 20Watt earthed PSU	Yes
Mains Cable	IEC Mains Lead	Yes

Introducing SmartLynx CAT 5 AV Extender

What is SmartLynx?

The SmartLynx is a combination of transmitter and receiver devices designed to transmit high resolution computer video and/or audio signal over CAT 5 wire. AV stands for Audio Visual and includes such signal formats as Broadcast Video (TV video signal), Computer Video (VGA, SVGA, SXGA and etc. signals) and various formats of Audio signals.

Why is SmartLynx necessary?

Sometimes AV signals need to be transmitted over distances greater than commonly specified product limitations of 5m. In this case several choices are available, but most are expensive and bulky, which is in some cases simply not practical, due to space limitations in the conduits.

The SmartLynx allows the transmission of AV signals over a standard CAT 5 UTP cable over distances of up to 300m. The actual distance is a function of the signal resolution and cable quality. The following is a rough guide to distance and resolution:

Cat5 Cable Length	Maximum Recommended Resolution
200m	UXGA (1600x1200)
200m	1080p (1920x1080)
300m	SXGA (1280x1024)

How does SmartLynx work?

The Smart-e SmartLynx is a transmitter and receiver pair designed to extend video, stereo audio and IR/RS232 signals over (UTP) unshielded twisted pair category 5 (CAT 5) cabling. They are supplied with a UK power supply and consist of: a transmitter with a video input (connectors vary by model), an audio input and a CAT 5 output and a receiver with a CAT 5 input and corresponding outputs. Certain models are also supplied with local outputs and/or IR or RS232 connections.

The extended signals depends on the model, but supported signals are UXGA, CVBS, YUV (YPbPr), Y/C, RGsB and RGBS analogue format and Stereo Audio. The basic concept behind this product is the ability to encode and decode analogue signal combined with precise line equalization and compensation.

Installation and Operation

1. Preparing for installation

Start installation process by ensuring that all video displays and audio devices are compatible with the computers being used. This is accomplished by connecting the devices directly to the computer and checking that the devices operate as desired without the SmartLynx system.
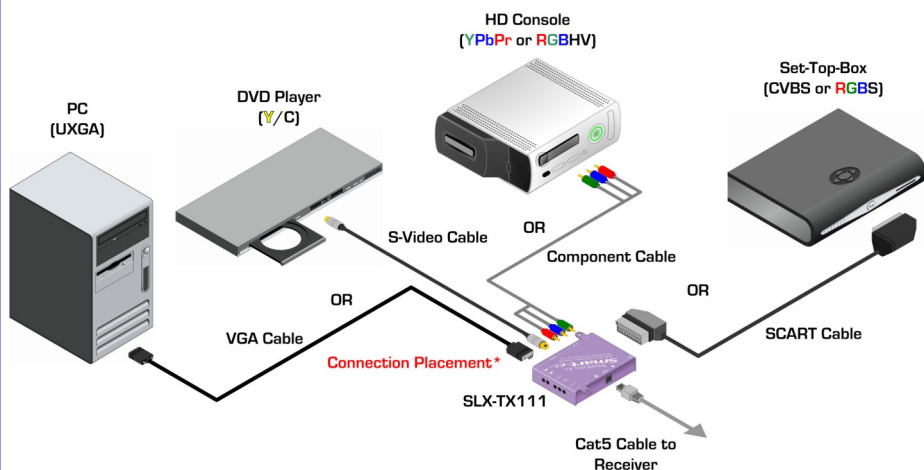
Potential System Set-ups:
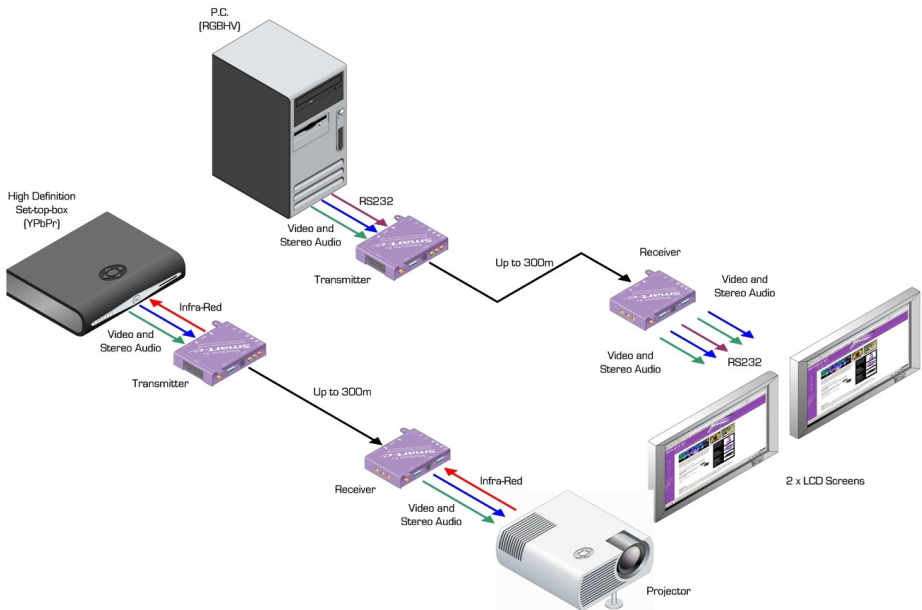
Install CAT 5 wiring between desired locations. In order to minimize system operation difficulties, avoid routing the system cables near fluorescent lights, air conditioners, or machines that may create electrical noise.

Please note that the SLX-TX111 is a universal transmitter, used as a transmitter for all various SmartLynx pairs: SLX-100, SLX-111, SLX-214, SLX-300
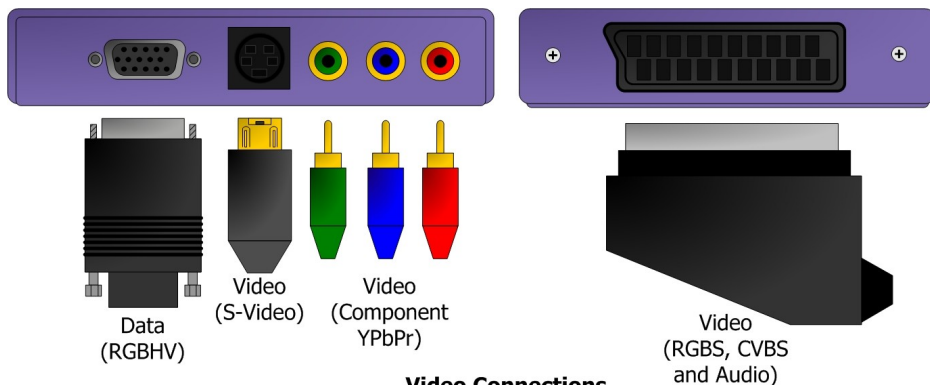
2. Connecting the video signal source to the transmitter

2.1   Connect the video output of the source device to the appropriate input of the transmitter using the relevant cable.

2.2   Although there are multiple connector types, only one feed of video may be routed by the product at any one time, the multitude of connectors are to simplify installations.

2.3   SCART connection requires the appropriate CAT 5 receiver (SLX-RX111 or SLX-RX211)

HD Console
(YPbPr or RGBHV)

Set-Top-Box
(CVBS or RGBS)

PC
(UXGA)

DVD Player
(Y/C)

S-Video Cable

OR

Component Cable

OR

OR

VGA Cable

SCART Cable

Connection Placement*

SLX-TX111

Cat5 Cable to Receiver

*SLX-TX111
Connection Placement

Video
(S-Video)

Video
(Component
YPbPr)

Data
(RGBHV)

Video
(RGBS, CVBS
and Audio)

Video Connections

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3. Connecting Audio, Infrared (IR) and RS232 to the transmitter

3.1 Connect the audio output of the source device to one of the mini-jack connectors on the SLX-TX111, using a 3.5mm stereo jack plug. Both connectors are wired in parallel so either connector will do, the other connection provides for a high impedance loop for local speakers
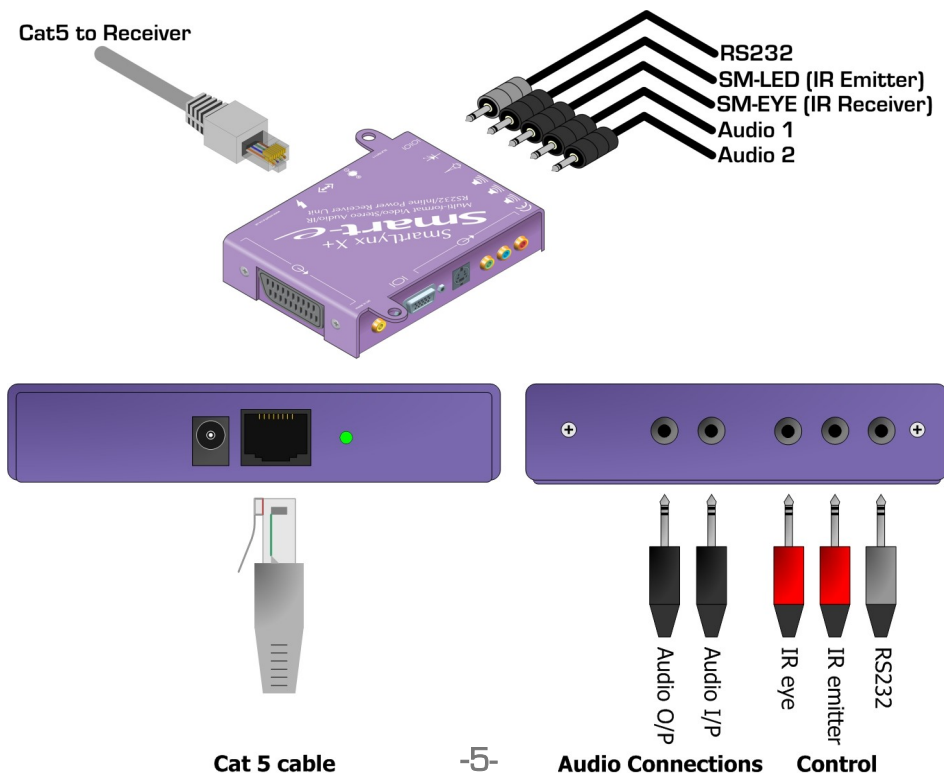
3.2 If you want to control the source device via IR from the display then connect an infrared emitter 'LED' (Smart-e part code SM-LED) to the jack position as shown in the diagram below.

Please note: the IR emitter is industry standard pin out.

3.3 If you want to send IR up the CAT 5 cable to the display then connect an infrared receiver 'eye' (Smart-e part code SM-EYEN) to the jack position as shown in the diagram below.

Please note: connecting the IR 'eye' will prevent the RS232 path to the display. Also the system will only work with the Smart-e specific IR receiver.

3.4 Connect the 24V dc power supply to the jack socket located next to the RJ45. Note this will provide power to the receiver unit through the CAT 5 cable

Cat5 to Receiver

RS232
SM-LED (IR Emitter)
SM-EYE (IR Receiver)
Audio 1
Audio 2

Audio O/P
Audio I/P
IR eye
IR emitter
RS232

Cat 5 cable -5- **Audio Connections** **Control**

4. Setting the jumpers for required video format

4.1　　The diagram below illustrates how the jumpers must be set for each required video format.

4.2　　For RGBS ensure the first jumper is set to RGBS and the second to RGBS

4.3　　For VGA ensure the first jumper is set to VGA and the second to VGA.

4.4　　For composite video (CVBS scart) ensure that the first jumper is set to VGA and the second to CVBS.

4.5　　For composite video (using phono) ensure that the second jumper is set to VGA.
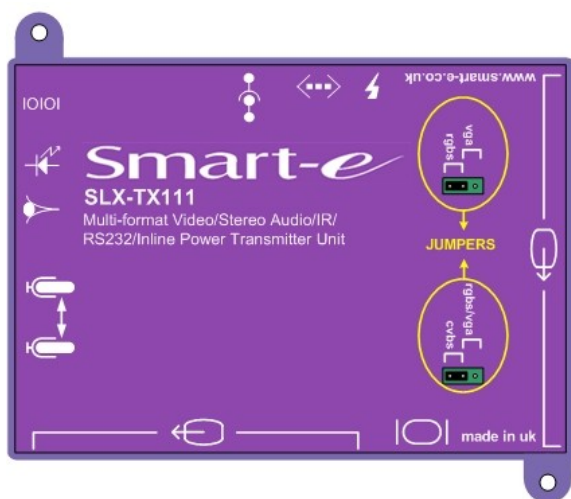
5. System Power up

     5.1   Turn the system on by plugging in the power adapter to the SmartLynx Transmitter (or Receiver if preferred)

     5.2   Power up your computer.

     5.3   Observe both transmitter and receiver power LED are ON, and source device is switched on.

6. Preparing and connecting System CAT-5 cable

The SmartLynx utilizes category 5 (CAT 5), unshielded twisted pair (UTP) cable to transport signal between transmitter and receiver.

CAT 5 cable is more desirable than coaxial cable, due to its low cost and ease of installation. This cable is used for LAN applications and is found in abundance, already installed, in many buildings. The category 5 is a standard which establishes minimum requirements for telecommunications cabling within a commercial building. The standard covers various aspects of wiring including telecommunications outlets.

Following is the wiring standard for terminating CAT5 cable using RJ45 connector:

Pair 1   Pins 1 & 2
Pair 2   Pins 3 & 6
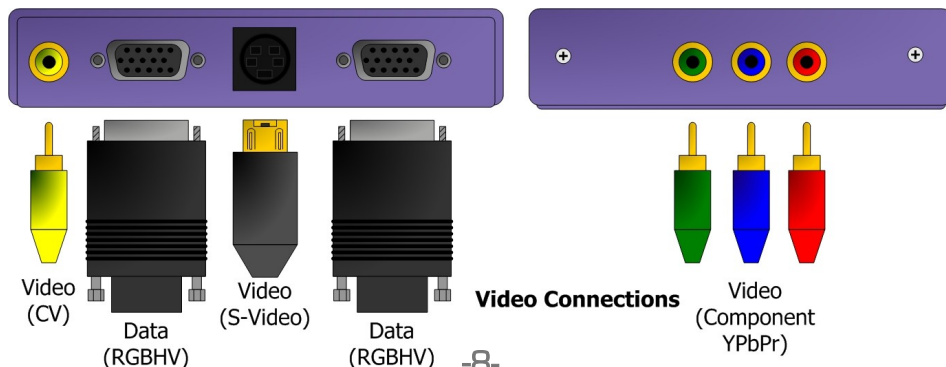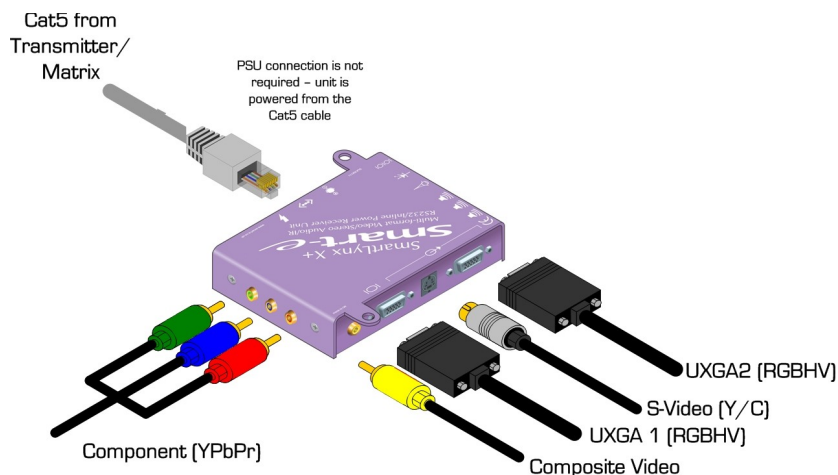Pair 3   Pins 4 & 5
Pair 4   Pins 7 & 8
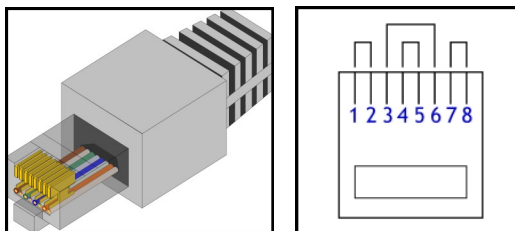
Connectors:	RJ-45
Capacitance:	14 pf/ft (46.2 pf/m)
Conductor Gauge:	24 AWG
Impedance:	100 +/- 15 ohms
	4 - Pair

7. Connecting SLX-RX214 to the display device

7.1   Making sure that the CAT 5 cable is connected to the transmitter output, connect the cable to the RJ45 socket on the receiver unit.

7.2   If the cable connection is correct, the green power LED on the front of the receiver should illuminate (power is sent up the CAT 5 cable).

7.3   Connect the display to relevant connector on the receiver (see diagram below) using the appropriate cable.

7.4   The receiver is able to drive all the video connections simultaneously so multiple cables can be attached.

7.5   The RX214 receives its power from the CAT 5 cable for distances up to 200m, beyond this an external PSU is required (Smart-e part code PSU-24V-EARTHED)

Cat5 from Transmitter/ Matrix

PSU connection is not required – unit is powered from the Cat5 cable

UXGA2 [RGBHV]
S-Video [Y/C]
UXGA 1 [RGBHV]
Composite Video

Component [YPbPr]

Video (CV)

Data (RGBHV)

Video (S-Video)

Data (RGBHV)

Video Connections

Video (Component YPbPr)

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8. Connecting SLX-RX214 to audio, RS232 and Infrared control

8.1 Connect the speakers or audio input on the display to the audio output on the receiver, using a 3.5mm jack plug. The three connections all drive the same audio signal.
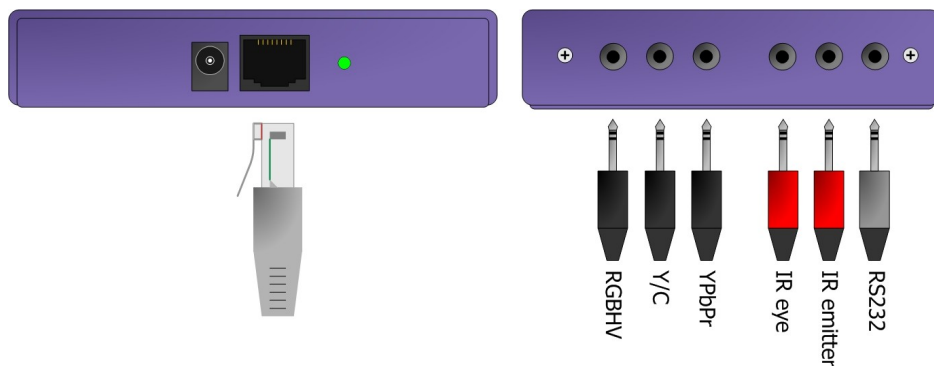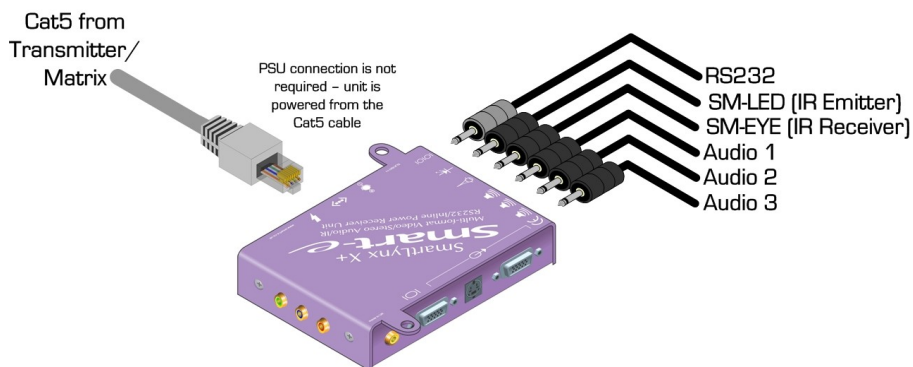
8.2 If you are using the receiver to transmit Infra-Red signals back down the cable to the transmitter unit, then connect an infrared receiver 'eye' (Smart-e part code SM-EYEN) to the jack position as shown in the diagram below.

Please note: connecting the IR 'eye' will prevent the return RS232 path from the display. Also the system will only work with the Smart-e specific IR receiver.

8.3 If using the receiver to transmit Infrared signals up to the display from the transmitter unit, then connect an infrared emitter 'LED' (Smart-e part code SM-LED to the jack position as shown in the diagram below.

Please note: the IR emitter is industry standard pin out.

8.4 If RS232 control is required, then connect to the display via the 3.5mm minijack on the receiver using a CAB-JDM-1M (Db9 plug)

Cat5 from
Transmitter/
Matrix

PSU connection is not
required – unit is
powered from the
Cat5 cable

RS232
SM-LED (IR Emitter)
SM-EYE (IR Receiver)
Audio 1
Audio 2
Audio 3

Cat 5 cable

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Audio Connections   **Control**

RGBHV   Y/C   YPbPr   IR eye   IR emitter   RS232

Installation and Operation—SLX-RX214

The settings of the RX214 are configured using the three push buttons located underneath the unit whilst the Red, Blue and Green LED's indicate the programming mode.

Below is a list of the following adjustments that can be made to the unit:

- Adjusting the cable compensation (EQ) level
- Increase/decrease the Red signal delay
- Increase/decrease the Green signal delay
- Increase/decrease the Blue signal delay
- Reset the unit to factory settings

The four programming modes can be accessed by repeatedly pressing the "SET" button. The modes run in sequence 1-4. Pressing the "SET" button a fifth time will exit the programming mode.

9.   Adjusting the EQ level

To alter the EQ level press the "SET" button and all three Red, Green and Blue LED's will illuminate. With all LED's activated the EQ can be increased by pressing the "INC" button and decreased by pressing the "DEC" button. If the "INC" or "DEC" buttons are quickly pressed once and released the unit will increment or decrement the EQ value by a single step, equivalent to 1 metre. If the "INC" or "DEC" button is held down for a few seconds the EQ will gradually increase or decrease continuously until released. When the maximum or minimum adjustment is reached all three LED's will flash simultaneously.

10.   Adjusting the Skew error

Increase/decrease the Red signal delay

To change the amount of Red signal delay press the "SET" button twice and the Red LED only will illuminate. With the Red LED activated the amount of delay can be altered in steps of 2ns by pressing the "INC" or "DEC" button once. If the "INC" or "DEC" is held down the amount of delay will increase or decrease continuously until released. When the limits of the delay line are reached the Red LED will flash.

Increase/decrease the Green signal delay

To change the amount of Green signal delay press the "SET" button three times and the Green LED only will illuminate. With the Green LED activated the amount of delay can be altered in steps of 2ns by pressing the "INC" or "DEC" button once. If the "INC" or "DEC" is held down the amount of delay will increase or decrease continuously until released. When the limits of the delay line are reached the Green LED will flash.

Increase/decrease the Blue signal delay

To change the amount of Blue signal delay press the "SET" button four times and the Blue LED only will illuminate. With the Blue LED activated the amount of delay can be altered in steps of 2ns by pressing the "INC" or "DEC" button once. If the "INC" or "DEC" is held down the amount of delay will increase or decrease continuously until released. When the limits of the delay line are reached the Blue LED will flash.

Reset the unit to factory settings

Holding all three buttons simultaneously will cause both the Red and Green LED's to flash. When the buttons are then released the unit will now have a value of zero for the EQ setting and the Red, Green and Blue skew positions will be reset to the start position.

Note

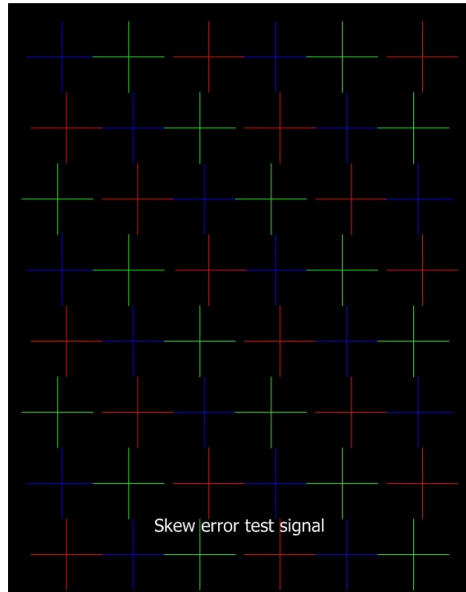Although all 3 colours can be delayed it is usually only necessary to delay 2 of the colours to achieve skew error compensation.

10a. Incorrect Skew adjustment.

In this example the Red signal is most delayed, and the Green signal the least delayed.

Skew error test signal

10b. Correct Skew adjustment.

In this example colours are in alignment, and hence correctly equalized.
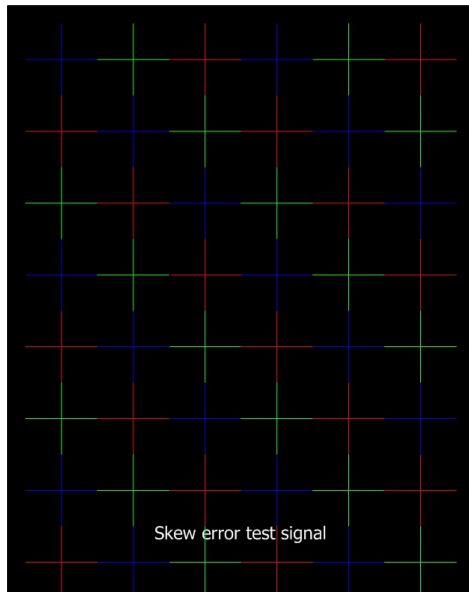
Skew error test signal

11.   Mounting the Receiver

The receiver unit can compensate for cable losses over a length of 20-300m, and for mounting purposes the unit is provided with two 'mounting-hole' points for fixing to the wall or screen (See diagram below). Simply hold receiver in place, mark position of holes and set screws in these locations.

NB. Always use screws with heads larger than the holes.

'MOUNTING-HOLES'

'MOUNTING-HOLES'
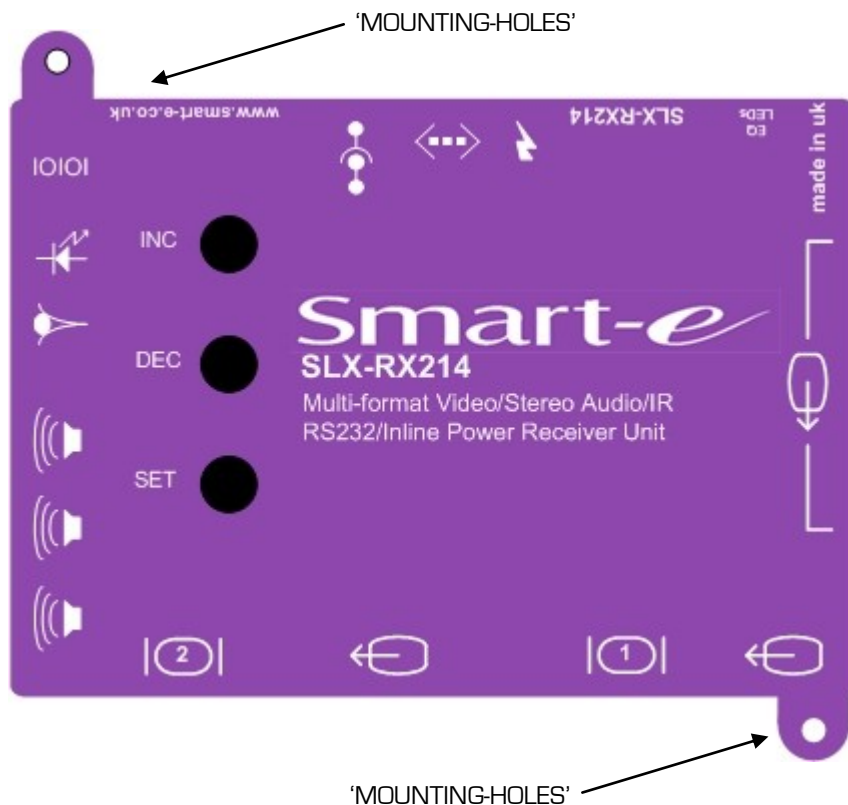
Technical Information

SLX-214

Video Input

Signal Type - Connector............. UXGA-HD15 / YUV-3xRCA / Y/C-4pin minidin / CVBS

Bandwidth.. 400MHz

Impedance...................................... 75 Ohm

Audio Input

Signal Type...................................... Stereo Audio

Bandwidth.. 20kHz, 0dB

Impedance...................................... 10k Ohm

Connector.. 2 x 3.5mm minijack sockets

Video Output

Signal Type - Connector............. UXGA-HD15 / YUV-3xRCA / Y/C-4pin minidin / CVBS

Bandwidth.. 400MHz

Impedance...................................... 75 Ohm

Audio Output

Signal Type...................................... Stereo Audio

Bandwidth.. 20kHz, 0dB

Impedance...................................... 100 Ohm

Connector.. 3 x 3.5mm mini-jack sockets

IR Input

Signal Type...................................... 30-500kHz modulated IR

Connector.. 3.5mm mini-jack socket

IR Output

Signal Type...................................... 30-500kHz modulated IR

Connector.. 3.5mm minijack socket

RS232 Input

Signal Type...................................... RS232 up to 115kbaud, full duplex tx, rx.

Connector.. 3.5mm mini-jack socket

RS232 Output

Signal Type...................................... RS232 up to 115kbaud, full duplex tx, rx.

Connector.. 3.5mm mini-jack socket

Power

Requirement - Connector........... 24VDC 500mA - 5mm x 2.1mm

Dimensions

Size... 120 x 94 x 23 mm

Weight... 0.2kg

Troubleshooting

No video?

1) Are the green LEDs on both the transmitter and receiver units? If not, check that the 24V power supply (PSU) is connected and the LED on the PSU is lit. Check the cable compensation, over compensation of the Red and Blue channels can cause the display to misinterpret the sync pulses and not display an image. If necessary reset the receiver to factory settings (see page 11)
2) Is the video source a laptop or floating? (a floating source is one which has no earth reference i.e. uses a double insulated PSU or a figure 8 mains cable). If so, make sure the PSU is the unit supplied with the equipment and connected to the transmitter SLX-TX111 (this will earth the source device)
3) Is the audio input level too high? The audio level should be set to line level (0dB or 700mV peak to peak) to prevent interference.

Image looks soft with dark streaks to the right

1) Cable compensation not set correctly (see page 11)

Image looks blurred and text has colour fringes

1) Skew compensation not set correctly (see page 11)

Display has horizontal black line interference in time with the audio

1) Audio level is too high. The audio level should be set to line level (0dB or 700mV peak to peak) to prevent interference. Turn down the volume of the source device.

Image shifted to one side?

1) Polarity of H and V sync are incorrect, contact factory for advice about changing the sync polarity.

Dim power light on the SLX-RX214

1) CAT 5 cable length longer then 200m, SLX-RX214 requires a local PSU

Limited Warranty Statement

A.   Extent of limited warranty

1.   Smart-e (UK) Ltd warrants to the end-user customers that Smart-e product specified above will be free from defects in materials and workmanship for the duration of 1 year, which duration begins on the date of purchase by the customer. Customer is responsible for maintaining proof of date of purchase.

2.   Smart-e warranty covers only those defects which arise as a result of normal use of the product, and do not apply to any:

a. Improper or inadequate maintenance or modifications

b. Operations outside product specifications

c. Mechanical abuse and exposure to severe conditions

3.   If Smart-e receives during applicable warranty period notice of defect, Smart-e will at its discretion replace or repair defective product . If Smart-e is unable to replace or repair defective product covered by the Smart-e warranty within reasonable period of time Smart-e shall refund the cost of the product.

4.   Smart-e shall have no obligation to repair, replace or refund unit until customer returns defective product to Smart-e.

5.   Any replacement product could be new or like new, provided that it has functionality at least equal to that of the product being replaced.

6.   Smart-e warranty is valid in any country where the covered product is distributed by Smart-e.

B. Limitations of warranty
TO THE EXTENT ALLOWED BY LOCAL LAW, NEITHER SMART-E OR ITS THIRD PARTY SUPPLIERS MAKE ANY OTHER WARRANTY OR CONDITION OF ANY KIND WHETHER EXPRESSED OR IMPLIED , WITH RESPECT TO THE SMART-E PRODUCT, AND SPECIFICALLY DISCLAIM IMPLIED WARRANTIES OR CONDITIONS OF MERCHANTABILITY, SATISFACTORY QUALITY , AND FITNESS FOR A PARTICULAR PURPOSE.

C. Limitations of liability
To the extent allowed by local law the remedies provided in this warranty statement are the customers sole and exclusive remedies

TO THE EXTENT ALLOWED BY LOCAL LAW, EXCEPT FOR THE OBLIGATIONS SPECIFICALLY SET FORTH IN THIS WARRANTY STATEMENT, IN NO EVENT WILL SMART-E OR ITS THIRD PARTY SUPPLIERS BE LIABLE FOR DIRECT, INDIRECT, SPECIAL, INCIDENTAL, OR CONSEQUENTIAL DAMAGES WHETHER BASED ON CONTRACT , TORT OR ANY OTHER LEGAL THEORY AND WHETHER ADVISED OF THE POSSIBILITY OF SUCH DAMAGES.

D. Local law
To the extent that this warranty statement is inconsistent with local law, this warranty statement shall be considered modified to be consistent with such law.

Partial Product List

Product Range	Product Code	Description
SmartLynx - X	SLX-100 SLX-400	Transmitter and Receiver Pair Transmitter and Receiver Pair
SmartLynx-X +	SLX-111 SLX-214	100m Transmitter and Receiver Pair with RS232/IR 300m Transmitter and Receiver Pair with RS232/IR
SmartCast - X	SCX-TX600	One to Six Transmitter Unit
SmartCast-X+	SCX-TX550	One to Five Transmitter Unit with RS232/IR
SmartCast System	TUSC-1042 SCX-TX120E SCX-TX550E SLX-RX100ES	SmartCast Euro card Rack (Up to 16 cards) Dual Screen Transmitter Euro card One to Five Transmitter Euro card with RS232/IR Euro card Receiver for UGXA,YUV,Y/C, and Audio
SmartNet-X+ Matrix Switches	SNX-8x8+ SNX-16x16+	8 x 8 Distribution Matrix 16 x 16 Distribution Matrix (Up to 256 x 256)
SmartNet-X+ Matrix Bundles	SNX-8X8IRP SNX-8X8RSP	Complete Infrared Controlled 8X8 Matrix Package Complete RS232 Controlled 8X8 Matrix Package